

#2, OIPE

RAW SEQUENCE LISTING

1 <110> APPLICANT: H. William Harris

DATE: 05/16/2002

PATENT APPLICATION: US/10/016,496 TIME: 14:07:55

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Edward M. Brown
         Steven C. Hebert
 3
 4 <120> TITLE OF INVENTION: Polycation-Sensing Receptor in Aquatic
        Species and Methods of Use Thereof
 6 <130> FILE REFERENCE: 2856.1001-007
                                                            ENTERED
 7 <140> CURRENT APPLICATION NUMBER: 10/016,496
 8 <141> CURRENT FILING DATE: 2001-12-10
10 <150> PRIOR APPLICATION NUMBER: US/09/162,021B
11 <151> PRIOR FILING DATE: 1998-09-28
12 <150> PRIOR APPLICATION NUMBER: PCT/US97/05031
13 <151> PRIOR FILING DATE: 1997-03-27
14 <150> PRIOR APPLICATION NUMBER: 08/622,738
15 <151> PRIOR FILING DATE: 1996-03-27
16 <160> NUMBER OF SEQ ID NOS: 19
17 <170> SOFTWARE: FastSEQ for Windows Version 4.0
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20 <211> LENGTH: 4134
21 <212> TYPE: DNA
22 <213> ORGANISM: squalas acanthias
23 <220> FEATURE:
24 <221> NAME/KEY: CDS
25 <222> LOCATION: (439)...(3522)
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28
         tattaaaatg tttctgcaag gatggcttca cgagaaatca attctgcacg ttttcccatt 180
29
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30
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31
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32
         qcaqaaatcc tccaggcatc ctctgtaaac gggctggcgt agtgtggctt ggtcaaggaa 420
33
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34
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35
36
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                                                                            519
37
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38
39
                      15
                                          20
                                                                            567
40
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         Gln Arg Ala Gln Lys Lys Gly Asp Ile Ile Leu Gly Gly Leu Phe Pro
41
42
                                      35
         ata cac ttt gga gta gcc gcc aag gat cag gac tta aaa tcg aga ccg
                                                                            615
43
         Ile His Phe Gly Val Ala Ala Lys Asp Gln Asp Leu Lys Ser Arg Pro
44
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45
              45
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46												ggc					663
47		Ala	Thr	Lys	Cys		Arg	Tyr	Asn	Phe		Gly	Phe	Arg	Trp		
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49												aac					711
50	GIn	Ala	Met	He		Ala	TTE	GIU	GIU		Asn	Asn	ser	мет		Pne	
51					80					85				<b>.</b>	90		750
52												gac					759
53	Leu	Pro	Asn		Thr	Leu	GIĀ	Tyr		IIe	Pne	Asp	Thr		ASN	Thr	
54				95					100					105			007
55												gtg					807
56	vaı	ser	_	Ala	Leu	GIU	Ата		ьeu	ser.	Pne	Val		GIII	ASII	тух	
57			110					115		44		<b>.</b>	120		+		855
58												tgc					655
59	lle	-	ser	ьeu	Asn	ьеu		GIU	Pne	Cys	ASN	Cys	ser	Asp	HIS	He	
60		125					130					135		-+-	+ ~ ~	2.55	903
61												tca					903
62		Ser	Thr	TTE	Ата		vaı	GIY	Ala	Thr		Ser	GIY	TTE	ser		
63	140					145					150					155	0.5.1
64												cca					951
65	Ala	Val	Ala	Asn		ьeu	GTĀ	ьeu	Pne		ше	Pro	GIN	vaı		туг	
66					160					165					170	44~	000
67												gag					999
68	Ala	Ser	Ser		Arg	Leu	Leu	ser		гаг	Asn	Glu	туг		Ala	Pne	
69				175					180					185			1047
70	_						_					acg					1047
71	Leu	Arg		шe	Pro	Asn	Asp		GIN	GIN	Ala	Thr		мес	Ата	GIU	
72			190				<b>.</b>	195	<b>.</b>				200	~~~	~~~	~~~	1005
73												acc					1095
74	iie		GIU	HIS	Pne	GIN	_	ASN	тгр	vai	СТУ	Thr	ьeu	Ата	Ата	Asp	
75		205					210	_++			++-	215	~~~	~~~	<b>~~~</b>	~++	1143
76												cgg					1143
77	_	Asp	Tyr	GTĀ	Arg		GTĀ	тте	Asp	гаг	230	Arg	GIU	GIU	АТА	235	
78	220					225						a+a	+-+	~~~	+		1191
79												atc					1171
80	ьуѕ	Arg	Asp	ше		TTE	ASP	Pne	ser	245	Met	Ile	261	GIII	250	тут	
81					240	~~~	++-	a + a	~~~		a+ a	2+4	a > a	224		taa	1239
82		_	_	-								atc					1233
83	THE	GIN	гуѕ		ьец	GIU	Pne	TIE		ASP	Val	Ile	GIII	265	261	261	
84				255			++-	+	260	~~~	~~~	~~~	ata		aaa	ata	1287
85												gac					1207
86	Ala	гуѕ	270	тте	vai	Val	Pne	275	ASII	СТУ	PIO	Asp	280	GIU	FIO	пеп	
87		~~~		-+-	+-	~~~	200		2 t a	200	<b>~</b> >+	cgg		+ ~ ~	ata	acc	1335
88												Arg					#333
89 90	тте	285	GIU	тте	val	Arg	290	ASII	тте	TIIT	roh	295	116	11P	шeu	ALG	
90	200		ac+	+~~	~~~	200		+ ~~	a+ c	a++	acc	aag	CC3	asa.	tac	ttc	1383
92												Lys					100
93	300	GLU	MId	ттЪ	HIG	305	261	2CT	μeu	116	310	шуз	110	Jau	- Y -	315	
		a+~	a+ ~	~~~	~~~		a+~	~~~	++~	act		agg	aca	aaa	ca+		1431
94	Cac	y Ly	y cc	ggc	gge	acc	alc	gge	LLC	gul		ayy	909	999	cyc	acc	7-4-7-T

95 96	His	Val	Val	Gly	Gly 320	Thr	Ile	Gly	Phe	Ala 325	Leu	Arg	Ala	Gly	Arg 330	Ile	
96 97	003	aaa	t+a	220		ttc	cta	aad	gag	gtc	cac	aaa	age	agg		tca	1479
98										Val							
99	FIO	Gry	FIIC	335	цуз	1110	пса	Lys	340	<b>,</b> u =			501	345			
100	a a c		. aaa		ato	aan	gag	r ttc		ı dad	тааа	acc	tto		: tac	tac	1527
101										o Glu							
101	WoF	ASI	350		vai	БУБ	GIU	355		, 010	. 014		360		. 0,0	-1-	
102	++0	. 200			200	cta	- a.co			ı aad	aat	tec			r ccc	tcg	1575
103																Ser	
105	1110	365		. Lys		шсч	370					375					
106	cac			r aca	act	caa			. aa	e taa	aaq	αco	aaa	raac	tcc	aga	1623
107										, Ser							
108	380	_		, 11±0		385					390		2			395	
109			י מככ	: cta	cac			t.ac	act	. aaa			raac	ato	acc	agc	1671
110										Gly							
111	5				400			- 4 -		405					410		
112	ata	rαac	racc	e ddd			σat	tat	aca	acac	ctq	ago	rato	ta	tac	aat	1719
113																Asn	
114				415	-			-	420			-		425			
115	ata	tac	gto	qcc	gto	tac	tco	att	gct	t cac	gco	ctg	caa	a gad	ato	cac	1767
116										a His							
117		_	430			_		435					44(				
118	tct	: tgc	aaa	ccc	ggc	acg	ggo	ato	tt:	t gca	aac	gga	i tct	: tgt	gca	gat	1815
119	Sei	Cys	Lys	Pro	Gly	Thr	Gly	, Ile	Phe	e Ala	Asn	Gly	y Sei	с Суя	s Ala	Asp	
120		445					450					455					
121	att	aaa	aaa	gtt	gag	gco	tgg	g cag	gto	c ctc	aac	: cat	cto	g cto	g cat	ctg	1863
122	$11\epsilon$	E Lys	s Lys	val	. Glu	Ala	Trp	Glr	ı Val	l Leu	ı Asn	His	: Let	ı Lev	ı His	Leu	
123	460	)				465	,				470	)				475	
124																ggt	1911
125	Lys	s Phe	e Thi	: Asn	Ser	Met	: Gl3	/ Glu	ı Glı	n Val	. Asp	Phe	ası	a Ası	o Glr	Gly	
126					480					485					490		
127																gag	1959
128	Asp	Le	ı Lys	s Gly	Asn	Tyr	Thi	: Ile	e Ile	e Asr	Trp	Glr	ı Leı			Glu	
129				495					500					50!			
130																gct	2007
131	Asp	Glu			. Leu	ı Phe	His			l Gly	/ Asn	туз			а Туг	Ala	
132			510					515					520		ē		0055
133																, agt	2055
134	Lys			Asp	Arg	Leu			e Ası	n Glu	ı Lys			e Lei	ı Trp	Ser	
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136																gtg	2103
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138	540					545					550					555	2151
139	GG	a aad	c acc	agg	, aag	999	ato	c ato	gag	g ggg	g gag	CCC	aco	e Ego	e tgo	ttt	Z T 2 T
140	Pro	o Gly	y Thi	r Arg			, TT	s ITé	e GTI			Pro	T'N	ı cy	570	Phe	
141					560					565 ~ ++			- ~				2199
142	gaa	tgo	ato	g gca	ı tgt	. gca	gag	, gga	ı gaç	y CCC	agt	- yal	yai	a dd	yal	gca	41JJ
143	GI	т СА	s Met	L Ala	а Сув	S AL	i GIL	T GTZ	Y GIL	u Pne	s ser	. AS	ا لك ا	ı ASI	ı ASE	Ala	

														505			
144				575					580					585			0047
145														gag			2247
146	Ser	Ala		Thr	Lys	Cys	Pro		Asp	Phe	Trp	Ser		Glu	Asn	His	
147			590					595					600				0005
148														acg			2295
149	Thr		Cys	Ile	Ala	Lys		Ile	Glu	Tyr	Leu		Trp	Thr	Glu	Pro	
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152	Phe	Gly	Ile	Ala	Leu	Thr	Ile	Phe	Ala	Val	Leu	Gly	Ile	Leu	Ile		
153	620					625					630					635	
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155	Ser	Phe	Val	Leu	Gly	Val	Phe	Ile	Lys		Arg	Asn	Thr	Pro		Val	
156					640					645					650		
157														tcc			2439
158	Lys	Ala	Thr	Asn	Arg	Glu	Leu	Ser	Tyr	Leu	Leu	Leu	Phe	Ser	Leu	Ile	
159				655					660					665			
160														agg			2487
161	Cys	Cys	Phe	Ser	Ser	Ser	Leu	Ile	Phe	Iŀe	Gly	Glu	Pro	Arg	Asp	${ t Trp}$	
162			670					675					680				
163														gtc			2535
164	Thr	Cys	Arg	Leu	Arg	Gln	Pro	Ala	Phe	Gly	Ile	Ser	Phe	Val	Leu	Cys	
165		685					690					695					
166	atc	tcc	tgc	atc	ctg	gtg	aag	acc	aac	cgg	gtg	ctg	ctg	gtc	ttc	gag	2583
167	Ile	Ser	Cys	Ile	Leu	Val	Lys	Thr	Asn	Arg	Val	Leu	Leu	Val	Phe	Glu	
168	700					705					710					715	
169														ctc			2631
170	Ala	Lys	Ile	Pro	Thr	Ser	Leu	His	Arg	Lys	Trp	Val	Gly	Leu	Asn	Leu	
171					720					725					730		
172														gtc			2679
173	Gln	Phe	Leu	Leu	Val	Phe	Leu	Cys	Ile	Leu	Val	Gln	Ile	Val	Thr	Cys	
174				735					740					745			
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176	Ile	Ile	Trp	Leu	$\mathtt{Tyr}$	Thr	Ala		Pro	Ser	Ser	Tyr		Asn	His	Glu	
177			750					755					760				
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182	Ala	Leu	Gly	Phe	Leu	Ile	Gly	Tyr	Thr	Cys	Leu	Leu	Ala	Ala	Ile		
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185	Phe	Phe	Phe	Ala	Phe	Lys	Ser	Arg	Lys	Leu	Pro	Glu	Asn	Phe	Asn	Glu	
186					800					805					810		
187														gtc			2919
188	Ala	Lys	Phe	Ile	Thr	Phe	Ser	Met	Leu	Ile	Phe	Phe	Ile	Val	$\mathtt{Trp}$	Ile	•
189				815					820					825			
190														gtg			2967
191	Ser	Phe	Ile	Pro	Ala	Tyr	Val	Ser	Thr	Tyr	Gly	Lys	Phe	Val	Ser	Ala	
192			830					835					840				

193 194 195	tg gag gtg att gcc atc ctg gcc tcc agc ttc ggg ctg ctg ggc tgc 3015 Val Glu Val Ile Ala Ile Leu Ala Ser Ser Phe Gly Leu Leu Gly Cys 845 850 855	5
196 197 198	tt tac ttc aac aag tgt tac atc atc ctg ttc aag ccg tgc cgt aac 3063 le Tyr Phe Asn Lys Cys Tyr Ile Ile Leu Phe Lys Pro Cys Arg Asn 160 865 870 875	3
199 200 201	cc atc gag gag gtg cgc tgc agc acg gcg gcc cac gcc ttc aag gtg 3111 Thr Ile Glu Glu Val Arg Cys Ser Thr Ala Ala His Ala Phe Lys Val 880 885 890	-
202 203 204	reg gee egg gee ace ete egg ege age gee geg tet ege aag ege tee 3159 la Ala Arg Ala Thr Leu Arg Arg Ser Ala Ala Ser Arg Lys Arg Ser 895 900 905	)
205 206 207	ge age etg tge gge tee ace ate tee teg eee gee teg tee ace tge 3207 Fer Ser Leu Cys Gly Ser Thr Ile Ser Ser Pro Ala Ser Ser Thr Cys 910 915 920	,
208 209 210	rgg ccg ggc ctc acc atg gag atg cag cgc tgc agc acg cag aag gtc 3255 Hy Pro Gly Leu Thr Met Glu Met Gln Arg Cys Ser Thr Gln Lys Val 925 930 935	;
211 212 213	gc ttc ggc agc ggc acc gtc acc ctg tcg ctc agc ttc gag gag aca 3303 Ser Phe Gly Ser Gly Thr Val Thr Leu Ser Leu Ser Phe Glu Glu Thr 945 950 955	}
214 215 216	gc cga tac gcc acc ctc agc cgc acg gcc cgc agc agg aac tcg gcg 3351 ly Arg Tyr Ala Thr Leu Ser Arg Thr Ala Arg Ser Arg Asn Ser Ala 960 965 970	-
217 218 219	at ggc cgc agc ggc gac gac ctg cca tct aga cac cac gac cag ggc 3399 sp Gly Arg Ser Gly Asp Asp Leu Pro Ser Arg His His Asp Gln Gly 975 980 985	<del>)</del>
220 221 222	ecg cct cag aaa tgc gag ccc cag ccc gcc aac gat gcc cga tac aag 3447 Pro Pro Gln Lys Cys Glu Pro Gln Pro Ala Asn Asp Ala Arg Tyr Lys 990 995 1000	,
223 224 225	cg gcg ccg acc aag ggc acc cta gag tcg ccg ggc ggc agc aag gag 3495 la Ala Pro Thr Lys Gly Thr Leu Glu Ser Pro Gly Gly Ser Lys Glu 1005 1010 1015	5
226 227 228	gc ccc aca act atg gag gaa acc taa tccaactcct ccatcaaccc 3542 arg Pro Thr Thr Met Glu Glu Thr * .020 1025	!
229 230 231	eaagaacate etecaeggea geaeegtega eaaetgaeat eaaeteetaa eeggtggetg 3602 eecaaeetet eeeeteteeg geaetttgeg ttttgetgaa gattgeagea tetgeagtte 3662 ettttateee tgattttetg aettggatat ttaetagtgt gegatggaat ateaeaaeat 3722	2
232 233 234	atgagttgc acaattaggt gagcagagtt gtgtcaaagt atctgaacta tctgaagtat 3782 tgaactact ttattctctc gaattgtatt acaaacattt gaagtatttt tagtgacatt 3842 tgttctaac attgtcaaga taatttgtta caacatataa ggtaccacct gaagcagtga 3902	2
235 236 237	tgagattgc cactgtgatg acagaactgt tttataacat ttatcattga aacctggatt 3962 caacaggaa tataatgact gtaacaaaaa aattgttgat tatcttaaaa atgcaaattg 4022 aatcagatg tgtaaaattg gtaattactt ctgtacatta aatgcatatt tcttgataaa 4082	2
	aaaaaaaaa aaaaaaaaa aaaaaaaaaa aaaagcggcc cgacagcaac gg 4134 EQ ID NO: 2 ENGTH: 1027	

RAW SEQUENCE LISTING ERROR SUMMARY PATENT APPLICATION: US/10/016,496

DATE: 05/16/2002 TIME: 14:07:56

Input Set : N:\Crf3\RULE60\10016496.raw
Output Set: N:\CRF3\05162002\J016496.raw

## Please Note:

Use of n and/or Xaa have been detected in the Sequence Listing. Please review the Sequence Listing to ensure that a corresponding explanation is presented in the  $\langle 220 \rangle$  to  $\langle 223 \rangle$  fields of each sequence which presents at least one n or Xaa.

Seq#:3; Xaa Pos. 62

Seq#:7; Xaa Pos. 11,86

Seq#:8; Xaa Pos. 86

Seq#:11; Xaa Pos. 422,433

Seq#:12; Xaa Pos. 422,433

Seq#:15; N Pos. 3

Seq#:16; N Pos. 4,10

## VERIFICATION SUMMARY

PATENT APPLICATION: US/10/016,496 TIME: 14:07:56

DATE: 05/16/2002

Input Set : N:\Crf3\RULE60\10016496.raw
Output Set: N:\CRF3\05162002\J016496.raw

L:394 M:258 W: Mandatory Feature missing, <223> not found for SEQ ID#:3 L:394 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:3 after pos.:192 L:565 M:258 W: Mandatory Feature missing, <223> not found for SEQ ID#:7 L:565 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:7 after pos.:49 L:580 M:258 W: Mandatory Feature missing, <223> not found for SEQ ID#:7 L:580 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:7 after pos.:289 L:623 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:8 after pos.:80 L:793 M:258 W: Mandatory Feature missing, <223> not found for SEQ ID#:11 L:793 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:11 after pos.:1297 L:796 M:258 W: Mandatory Feature missing, <223> not found for SEQ ID#:11 L:796 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:11 after pos.:1308 L:860 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:12 after pos.:416 L:862 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:12 after pos.:432 L:899 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:15 L:902 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:15 L:905 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:15 L:908 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:15 L:909 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:15 after pos.:0 L:922 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:16 L:925 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:16 L:928 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:16 L:931 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:16 L:934 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:16 L:935 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:16 after pos.:0 L:948 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:17 L:951 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:17 L:965 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:18 L:968 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:18 L:971 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:18 L:974 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:18 L:977 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:18 L:991 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:19 L:994 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:19 L:997 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:19 L:1000 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:19 L:1003 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:19